

S/N: 09/829,500PATENTIN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Craig M. Gates, et al.

Examiner: Mutschler, Brian L.

Serial No.: 09/829,500

Group Art Unit: 1753

Filed: April 9, 2001

Docket No.: 10003884-1

Title: RE-USEABLE MANDREL FOR FABRICATION OF INK-JET ORIFICE PLATE

SUPPLEMENTAL AMENDMENT

Commissioner for Patents  
Mail Stop Non-Fee Amendment  
P.O. Box 1450  
Washington, D.C. 20231

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In Supplemental Amendment is in response to the Notice of Non-Compliant Amendment mailed on March 4, 2004, please consider the following amendment and remarks.

In the Specification:

Please delete paragraph [0025] and insert therefore:

[0025] Turning to Figure 4, it can now be recognized that a solid glass child mandrel 401 piece has been formed. The top surface 401' is metalized, preferably with stainless steel in a known manner as with metal 203, Figure 2A et seq. to a thickness in the approximate range of 0.5 to 1.0 forming superjacent metal 403 conformed to the shape and dimensions of the solid glass child mandrel 401 piece's top surface 401' features. Again using a photoresist masking process, child mandrel pillar(s) 405 are rendered non-conducting by depositing a dielectric 407, preferably silicon carbide "SiC," to a thickness in the approximate range of 3500 to 4000Å. The child mandrel 411 is completed, ready for use in electroforming orifice plate sheets for ink-jet printheads. Thus Figure 4 shows a child mandrel 411 in accordance with the present invention having physical features 405 to control ink-jet nozzle bore profile. Each physical feature has the inverse shape of the desired bore geometry. For example, the feature(s) 405 can have a circular base with a truncated conical shape having a taper angle  $\Theta$ . The relationship between the electroform thickness, base diameter, and nozzle exit bore is now in accordance with the equation:

$$D_{\text{Bore}} = D_{\text{Base}} - 2T \tan \Theta$$

Equation 2.